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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,537	06/23/2003	Hongxing Tang	009195-000410US	1726
20350	7590	07/30/2004	EXAMINER	
TOWNSEND AND TOWNSEND AND CREW, LLP			PRENTY, MARK V	
TWO EMBARCADERO CENTER			ART UNIT	
EIGHTH FLOOR			PAPER NUMBER	
SAN FRANCISCO, CA 94111-3834			2822	

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/602,537	TANG ET AL.	
	Examiner	Art Unit	
	MARK V PRENTY	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,7,8,15-17,21,24,25,31,32,41,44,45 and 47-52 is/are rejected.
- 7) ☒ Claim(s) 2,3,5,6,9-14,18-20,22,23,26-30,33-40,42,43 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>May 7, 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

This Office Action is in response to the papers filed on June 23, 2003.

The specification is objected to because the non-provisional application cited in paragraph [0001] is not identified by its Serial Number. Correction is required (i.e., the specification should be amended to identify that related application by its Serial Number).

Claim 3 is objected to because "the applied in-plane magnetic field" and "the transition" lack antecedent basis (claim 3 should apparently depend on claim 2).

Claims 1, 7, 16, 17, 24, 49 and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto et al. (United States Patent 4,315,273 – hereafter Yamamoto).

With respect to independent claim 1, Yamamoto discloses a ferromagnetic semiconductor composition (see the entire patent, particularly the Fig. 6 disclosure), comprising: a substrate layer 30; and a ferromagnetic semiconductor epilayer 34/42 formed on the substrate, said epilayer defining a plane and having a cubic hard axis; wherein a voltage transverse to said cubic hard axis is detectable in response to an applied current flow along the cubic hard axis.

Claim 1 is thus rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto.

With respect to dependent claim 7, Yamamoto's substrate is selected from the group consisting of GaAs and GaN (see column 3, lines 29-35, for example).

Claim 7 is thus rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto.

With respect to independent claim 16, Yamamoto discloses a ferromagnetic semiconductor device (see the entire patent, particularly the Fig. 6 disclosure), comprising: a substrate 30 defining a plane; a ferromagnetic semiconductor epilayer 34/42 formed on said substrate, said epilayer being substantially elongated and oriented along a cubic hard axis; and first and second electrical contacts 46/46', each contact coupled to an end of the elongated epilayer, said contacts being configured to provide an electrical current flow along the hard axis; wherein application of an electrical current flow along the hard axis produces a voltage substantially transverse to said hard axis.

Claim 16 is thus rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto.

With respect to dependent claim 17, Yamamoto's device further includes first and second transverse voltage probes 44/44' coupled at opposite sides of the elongated epilayer, said first and second probes being substantially equidistant from an end of the epilayer, wherein said voltage probes detect said transverse voltage responsive to said current flow.

Claim 17 is thus rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto.

With respect to dependent claim 24, Yamamoto's substrate is selected from the group consisting of GaAs and Mn doped GaN (see column 3, lines 29-35, for example).

Claim 24 is thus rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto.

With respect to dependent claims 49 and 51, Yamamoto's substrate 30 is a type III-V semiconductor (see column 5, lines 1-4, for example).

Claims 49 and 51 are thus rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto.

Claims 15 and 31 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamamoto et al. (United States Patent 4,315,273 – hereafter Yamamoto).

Claims 15 and 31 depend on independent claims 1 and 16, respectively. The above explanation of the rejection of independent claims 1 and 16 under 35 U.S.C. 102(b) as being anticipated by Yamamoto is hereby incorporated by reference into this rejection of dependent claims 15 and 31 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamamoto.

The difference between claims 15/31 and Yamamoto is a process one: their epilayers are formed by molecular beam epitaxy and "an epitaxial growth technique" (see Yamamoto at column 3, lines 29-41), respectively.

Insofar as molecular beam epitaxy is a conventional prior art epitaxial growth technique, claims 15 and 31 apparently result in products that are the same as or similar to Yamamoto's product. See MPEP 2113.

Claims 15 and 31 are thus rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamamoto.

Art Unit: 2822

Claims 4, 8, 21, 25, 50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto as applied to claims 1, 7, 16, 17, 24, 49 and 51 above, and further in view of Chin et al. (United States Patent 4,443,809 – hereafter Chin).

The difference between dependent claims 4, 8, 21, 25, 50, and 52 and Yamamoto is the claimed GaAs epilayer is doped with Mn (Yamamoto discloses that its GaAs epilayer 34 can be n-type or p-type – see column 5, lines 5-8 – but does not disclose a specific p-type dopant).

Chin teaches that Mn is a p-type dopant for GaAs (see column 6, lines 60-66).

It would have been obvious to one skilled in this art to make Yamamoto's GaAs epilayer p-type by doping it with Mn, because Chin teaches that Mn is a p-type dopant for GaAs.

Claims 4, 8, 21, 25, 50 and 52 are thus rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto together with Chin.

Claims 32, 44 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (United States Patent 4,315,273 – hereafter Yamamoto) together with Robert et al. (United States Patent 6,734,514 – hereafter Robert).

With respect to independent claim 32, Yamamoto discloses a method of measuring ferromagnetic-semiconductor materials (see the entire patent, particularly the Fig. 6 disclosure), comprising: providing a test sample including a ferromagnetic semiconductor epilayer 34/42 formed on a substrate 30, said epilayer being substantially planar and having a cubic hard axis and being substantially elongated; providing a current flow along the cubic hard axis; and detecting a transverse voltage in

Art Unit: 2822

the epilayer responsive to said current flow at a transverse voltage probe pair 44/44' in contact with the epilayer, the pair having probes in contact with the epilayer on opposite sides relative to the cubic hard axis.

The difference between claim 32 and Yamamoto is claim 32 uses a plurality of transverse voltage probe pairs (Yamamoto uses one transverse voltage probe pair 44/44').

Robert teaches that Hall effect devices such as Yamamoto's use at least one transverse voltage probe pair (see column 3, lines 13-20).

It would have been obvious to one skilled in this art to use a plurality of transverse voltage probe pairs in Yamamoto's Hall effect device, because Robert teaches that Hall effect devices conventionally use at least one transverse voltage probe pair.

Claim 32 is thus rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto together with Robert.

With respect to dependent claim 44, Yamamoto's substrate 30 is selected from the group consisting of GaAs and GaN (see column 3, lines 29-35, for example).

Claim 44 is thus rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto together with Robert.

With respect to dependent claim 47, Yamamoto's substrate 30 is a type III-V semiconductor (see column 5, lines 1-4, for example).

Claim 47 is thus rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto together with Robert.

Claims 41, 45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto together with Robert as applied to claims 32, 44 and 47 above, and further in view of Chin et al. (United States Patent 4,443,809 – hereafter Chin).

The difference between dependent claims 41, 45, and 48 and the obvious Yamamoto/Robert method is the claimed GaAs epilayer is doped with Mn (Yamamoto discloses that its GaAs epilayer 34 can be n-type or p-type – see column 5, lines 5-8 – but does not disclose a specific p-type dopant).

Chin teaches that Mn is a p-type dopant for GaAs (see column 6, lines 60-66).

It would have been further obvious to one skilled in this art to make the Yamamoto/Robert GaAs epilayer p-type by doping it with Mn, because Chin teaches that Mn is a p-type dopant for GaAs.

Claims 41, 45 and 48 are thus rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto together with Robert and Chin.

Claims 2, 3, 5, 6, 9-14, 18-20, 22, 23, 26-30, 33-40, 42, 43 and 46 are objected to as being dependent upon a rejected base claim, but would be allowable over the prior art of record if rewritten in independent form including all of the limitations of the base claim and any intervening claims

The prior art of record does not disclose or suggest the allowable ferromagnetic semiconductor devices taken as a whole, including the epilayer.

Tang et al. (United States Patent Application Publication 2004/0066674) and Tang et al. (United States Patent Application Publication 2004/0070038) are relevant to this application.

Art Unit: 2822

Registered practitioners can telephone the examiner at (571) 272-1843. Any voicemail message left for the examiner must include the name and registration number of the registered practitioner calling, and the Application/Control (Serial) Number. Technology Center 2800's general telephone number is (571) 272-2800.

Mark Prenty
Mark V. Prenty
Primary Examiner